

THE ASTROPHYSICAL JOURNAL

CONTENTS OF VOLUME 407, PART 1

1993 APRIL 10, Number 1

	<i>Page</i>	<i>Fiche</i>
SOLVING THE BERNOULLI-ZEL'DOVICH EQUATION <i>M. Lachièze-Rey</i>	1	69-B1
COSMOLOGICAL TIME EVOLUTION IN THE NEWTONIAN DYNAMICS OF COMPACT CELESTIAL BODIES <i>K. Nordtvedt</i>	5	69-B6
THE IM/dE,N MIXED MORPHOLOGY DWARF ESO 359-G29 AS A PROBE OF A MASSIVE HALO IN NGC 1532 <i>Allan Sandage & Edward Fomalont</i>	14	69-C1
THE LOCAL GALAXY DENSITY AND THE BARS OF SPIRAL GALAXIES <i>Giuliano Giuricin, Fabio Mardirossian, Marino Mezzetti, & Pierluigi Monaco</i>	22	69-D1
THE DARK MATTER DISTRIBUTION IN MS 2137-23 FROM THE MODELING OF THE MULTIPLE ARC SYSTEMS <i>Yannick Mellier, Bernard Fort, & Jean-Paul Kneib</i>	33	69-E1
PKS 1830-211 AS A GRAVITATIONALLY LENSED SYSTEM <i>Sunita Nair, D. Narasimha, & A. Pramesh Rao</i>	46	69-F5
DAMPED LYMAN-ALPHA ABSORPTION IN Q0957+561A, B <i>David A. Turnshek & Ralph C. Bohlin</i>	60	69-G7
RELATIVISTIC BULK MOTION IN ACTIVE GALACTIC NUCLEI <i>G. Ghisellini, P. Padovani, A. Celotti, & L. Maraschi</i>	65	70-A1
TURBULENT MIXING LAYERS IN THE INTERSTELLAR MEDIUM OF GALAXIES <i>Jonathan D. Slavin, J. Michael Shull, & Mitchell C. Begelman</i>	83	70-B7
THE IMPACT OF SUPERNOVA FRAGMENTS ON THE EVOLUTION OF MULTISUPERNOVA REMNANTS <i>J. Franco, A. Ferrara, M. Rózyczka, G. Tenorio-Tagle, & D. P. Cox</i>	100	70-C11
THE OPTICAL RECOVERY OF SN 1979C IN NGC 4321 (M100) <i>Robert A. Fesen & David M. Matonick</i>	110	70-D9
A METHOD FOR OBTAINING THE AGE AND SCALE HEIGHT OF THE THICK DISK FROM FAINT STRÖMGREN PHOTOMETRY <i>Ted von Hippel & Gregory D. Bothun</i>	115	70-E1
DIPOLE AND QUADRUPOLE TESTS OF THE ISOTROPY OF GAMMA-RAY BURST LOCATIONS <i>Michael S. Briggs</i>	126	70-F1
GAMMA RAYS FROM GLOBULAR CLUSTERS <i>Marco Tavani</i>	135	70-F11
THE DIFFUSE INTERSTELLAR BANDS. IX. CONSTRAINTS ON THE IDENTIFICATION <i>G. H. Herbig</i>	142	70-G5
CAN GALACTIC H I BE RADIATIVELY SUPPORTED? <i>A. Ferrara</i>	157	71-A7
WARM NEUTRAL HALOS AROUND MOLECULAR CLOUDS. V. OH (1665 AND 1667 MHz) OBSERVATIONS <i>Peter G. Wannier, B-G Andersson, S. R. Federman, B. M. Lewis, Y. P. Viala, & E. Shaya</i>	163	71-B1
OH ZEEMAN OBSERVATIONS OF DARK CLOUDS <i>R. M. Crutcher, T. H. Troland, A. A. Goodman, C. Heiles, I. Kazès, & P. C. Myers</i>	175	71-C1
DETERMINATION OF $^{12}\text{C}/^{13}\text{C}$ IN THE INTERSTELLAR MEDIUM TOWARD ζ OPHIUCHI AND ξ PERSEI <i>Isabel Hawkins, Nahide Craig, & David M. Meyer</i>	185	71-D1

CONTENTS

	<i>Page</i>	<i>Fiche</i>
G-STAR ASTROPAUSES: A TEST FOR INTERSTELLAR PRESSURE <i>P. C. Frisch</i>	198	71-E1
NONLINEAR GROWTH OF DYNAMICAL OVERSTABILITIES IN BLAST WAVES <i>Mordecai-Mark Mac Low & Michael L. Norman</i>	207	71-E11
THE EXCESS INFRARED EMISSION OF HERBIG Ae/Be STARS: DISKS OR ENVELOPES? <i>Lee Hartmann, Scott J. Kenyon, & Nuria Calvet</i>	219	71-F11
X-RAYS FROM EMISSION-LINE STARS IN THE HERBIG-HARO 1 REGION <i>Steven H. Pravdo & Lorella Angelini</i>	232	72-A1
ANALYSIS OF CONTACT BINARY SYSTEMS: AA URSAE MAJORIS, V752 CENTAURI, AO CAMELOPARDALIS, AND V677 CENTAURI <i>F. Barone, L. Di Fiore, L. Milano, & G. Russo</i>	237	72-A9
A SPECTROSCOPIC SEARCH FOR COLLIDING STELLAR WINDS IN O-TYPE CLOSE BINARY SYSTEMS. III. 29 UW CANIS MAJORIS <i>Michael S. Wiggs & Douglas R. Gies</i>	252	72-B11
THREE-BODY EFFECTS IN THE PSR 1257+12 PLANETARY SYSTEM <i>Renu Malhotra</i>	266	72-D3
THE CRAB PULSAR IN THE VISIBLE AND ULTRAVIOLET WITH 10 MICROSECOND EFFECTIVE TIME RESOLUTION <i>J. W. Percival, J. D. Biggs, J. F. Dolan, E. L. Robinson, M. J. Taylor, R. C. Bless, J. L. Elliot, M. J. Nelson, T. F. Ramseyer, G. W. van Citters, & E. Zhang</i>	276	72-E1
A THEORY OF NONLOCAL MIXING-LENGTH CONVECTION. I. THE MOMENT FORMALISM <i>Scott A. Grossman, Ramesh Narayan, & David Arnett</i>	284	72-F1
ON THE GENERATION OF SOUND BY TURBULENT CONVECTION. I. A NUMERICAL EXPERIMENT <i>Thomas J. Bogdan, Fausto Cattaneo, & Andrea Malagoli</i>	316	73-A7
PHOTOIONIZATION OF THE HYDROGEN ATOM IN STRONG MAGNETIC FIELDS <i>Alexander Yu. Potekhin & George G. Pavlov</i>	330	73-B11
RESISTIVE DISSIPATION AND MAGNETIC FIELD TOPOLOGY IN THE STELLAR CORONA <i>E. N. Parker</i>	342	73-C11
COSMIC-RAY MODULATION, MERGED INTERACTION REGIONS, AND MULTIFRACTALS <i>L. F. Burlaga, J. Perko, & J. Pirraglia</i>	347	73-D3
A MODEL OF THE "STEADY" AND "FLUCTUATING" PARTS OF THE SUN'S INTERNAL MAGNETIC FIELD <i>M. H. Gokhale & K. M. Hiremath</i>	359	73-E1
ON THE SOLAR DIFFERENTIAL ROTATION: MERIDIONAL MOTIONS ASSOCIATED WITH A SLOWLY VARYING ANGULAR VELOCITY <i>Bernard R. Durney</i>	367	73-E11
A NEW EXPLANATION OF SOLAR RADIO MILLISECOND "SPIKES" <i>Donat G. Wentzel</i>	380	73-F11
CAN EQUIPARTITION FIELDS PRODUCE THE TILTS OF BIPOLAR MAGNETIC REGIONS? <i>Sydney D'Silva</i>	385	73-G3
A SIPHON-FLOW MODEL OF THE PHOTOSPHERIC EVERSHED FLOW IN A SUNSPOT <i>John H. Thomas & Benjamin Montesinos</i>	398	74-A3
ION ABUNDANCES AND IMPLICATIONS FOR PHOTOCHEMISTRY IN COMETS HALLEY (1986 III) AND BRADFIELD (1987 XXIX) <i>Barry L. Lutz, Maria Womack, & R. Mark Wagner</i>	402	74-A9
THE SIZE DISTRIBUTION OF THE EARTH-APPROACHING ASTEROIDS <i>D. L. Rabinowitz</i>	412	74-B7
TIP-TILT COMPENSATION: RESOLUTION LIMITS FOR GROUND-BASED TELESCOPES USING LASER GUIDE STAR ADAPTIVE OPTICS <i>Scot S. Olivier, Claire E. Max, Donald T. Gavel, & James M. Brase</i>	428	74-D1
ERRATUM		
EFFECT OF BINARY SOURCES ON THE SEARCH FOR MASSIVE ASTROPHYSICAL COMPACT HALO OBJECTS VIA MICROLENSING <i>Kim Griest & Wayne Hu</i>	440	74-E1

CONTENTS

v

	<i>Page</i>	<i>Fiche</i>
TRANSITION SCALE TO A HOMOGENEOUS UNIVERSE <i>Jaan Einasto & Mirt Gramann</i>	443	76-B6
THE FREQUENCY OF MERGERS IN COMPACT GROUPS <i>Stephen E. Zepf</i>	448	76-B12
NEW HIGH-REDSHIFT DAMPED LYMAN-ALPHA ABSORPTION SYSTEMS AND THE REDSHIFT EVOLUTION OF DAMPED ABSORBERS <i>Richard L. White, A. L. Kinney, & Robert H. Becker</i>	456	76-C8
ALL-SKY CATALOGS OF SUPERCLUSTERS OF ABELL-ACO CLUSTERS <i>Elena Zucca, Giovanni Zamorani, Roberto Scaramella, & Giampaolo Vettolani</i>	470	76-D10
WHAT DETERMINES THE MORPHOLOGICAL FRACTIONS IN CLUSTERS OF GALAXIES? <i>Bradley C. Whitmore, Diane M. Gilmore, & Christine Jones</i>	489	76-F8
CHEMICAL AND LUMINOSITY EVOLUTION, AND COUNTS OF GALAXIES IN A MERGER MODEL <i>P. Colin & D. N. Schramm</i>	510	77-A1
THE CONTINUUM SLOPES AND EVOLUTION OF ACTIVE GALACTIC NUCLEI <i>Paul J. Francis</i>	519	77-A12
A NEW METHOD FOR THE IDENTIFICATION OF NON-GAUSSIAN LINE PROFILES IN ELLIPTICAL GALAXIES <i>Roeland P. van der Marel & Marijn Franx</i>	525	77-B5
TURBULENT MAGNETOHYDRODYNAMIC DYNAMO FOR ACCRETION DISKS USING THE CROSS-HELICITY EFFECT <i>Akira Yoshizawa & Nobumitsu Yokoi</i>	540	77-C8
DETERMINING THE SHAPE OF SPECTRA IN EXTENDED RADIO SOURCES <i>Debora M. Katz-Stone, Lawrence Rudnick, & Martha C. Anderson</i>	549	77-D5
BBXRT AND GINGA OBSERVATIONS OF THE SEYFERT 1 GALAXY MARKARIAN 335 <i>T. J. Turner, K. Nandra, A. A. Zdziarski, K. Jahoda, G. M. Madejski, F. Marshall, R. F. Mushotzky, R. Petre, K. A. Pounds, A. P. Smale, P. Serlemitsos, & K. Weaver</i>	556	77-D13
OPTICAL EMISSION-LINE PROPERTIES OF M33 SUPERNOVA REMNANTS <i>R. Chris Smith, Robert P. Kirshner, William P. Blair, Knox S. Long, & P. Frank Winkler</i>	564	77-E9
158 MICRON [C II] MAPPING OF NGC 6946: PROBING THE ATOMIC MEDIUM <i>S. C. Madden, N. Geis, R. Genzel, F. Herrmann, J. Jackson, A. Poglitsch, G. J. Stacey, & C. H. Townes</i>	579	77-F12
DYNAMICAL INSTABILITIES IN TWO-PHASE MEDIA AND THE MINIMUM MASSES OF STELLAR SYSTEMS <i>Stephen D. Murray, Simon D. M. White, John M. Blondin, & Douglas N. C. Lin</i>	588	77-G11
GAMMA-RAY OBSERVATIONS OF THE GALACTIC CENTER: REMOVING THE GALACTIC RIDGE CONTRIBUTION <i>Neil Gehrels & Jack Tueller</i>	597	78-A8
THE CENTER OF THE GALAXY IN THE RECENT PAST: A VIEW FROM GRANAT <i>R. A. Sunyaev, M. Markevitch, & M. Pavlinsky</i>	606	78-B7
ON THE NONLINEAR INSTABILITY OF A THERMAL FIELD <i>Miguel H. Ibáñez S., Antonio Parravano, & César A. Mendoza B.</i>	611	78-B13
RELAXATION OF MOLECULAR VELOCITIES AND SPECTRAL LINE PROFILES OF ASTROPHYSICAL MASERS <i>Nels Anderson & William D. Watson</i>	620	78-C10
THE DISPERSAL OF IRON THROUGH THE INTERSTELLAR MEDIUM <i>Nicholas P. T. Bateman & Richard B. Larson</i>	634	78-D12
INFRARED AND OPTICAL IMAGING OF IRAS SOURCES WITH CO OUTFLOW: A SNAPSHOT OF EARLY STAR FORMATION <i>H. Chen, A. T. Tokunaga, K. M. Strom, & K.-W. Hodapp</i>	639	78-E4
MASS LOSS IN GLOBULAR CLUSTER RED GIANTS: AN EVOLUTIONARY INVESTIGATION <i>M. Castellani & V. Castellani</i>	649	78-F1
EMBEDDED STAR CLUSTERS ASSOCIATED WITH LUMINOUS IRAS POINT SOURCES <i>John M. Carpenter, Ronald L. Snell, F. Peter Schloerb, & M. F. Skrutskie</i>	657	78-F11
A DETAILED STUDY OF SHEARED ALFVÉN WAVES AND THEIR POSSIBLE APPLICATION TO GAMMA-RAY BURSTS <i>Marco Fatuzzo & Fulvio Melia</i>	680	79-A8
THE BOLTZMANN EQUATION IN GENERAL RELATIVISTIC ROTATING SYSTEMS: COOLING OF ROTATING NEUTRON STARS <i>Juan A. Miralles, Kenneth A. Van Riper, & James M. Lattimer</i>	687	79-B1

CONTENTS

	<i>Page</i>	<i>Fiche</i>
THE ABUNDANCE OF LITHIUM IN METAL-POOR SUBGIANT STARS <i>C. A. Pilachowski, C. Sneden, & J. Booth</i>	699	79-C1
NOVA DUST NUCLEATION: KINETICS AND PHOTODISSOCIATION <i>D. J. Johnson, M. W. Friedlander, & J. I. Katz</i>	714	79-D4
THE ASYMMETRIC WIND OF R127 <i>R. E. Schulte-Ladbeck, C. Leitherer, G. C. Clayton, C. Robert, M. R. Meade, L. Drissen, A. Nota, & W. Schmutz</i>	723	79-E1
G62-46: AN UNRESOLVED DOUBLE DEGENERATE BINARY CONTAINING A MAGNETIC DA COMPONENT <i>P. Bergeron, María-Teresa Ruiz, & S. K. Leggett</i>	733	79-E13
SIGMA HARD X-RAY OBSERVATIONS OF GX 339-4 DURING THE HARD STATE AND A TRANSITION TO THE SOFT STATE <i>L. Bouchet, E. Jourdain, P. Mandrou, J. P. Roques, Ph. Laurent, F. Lebrun, J. Paul, L. Salotti, R. Sunyaev, E. Churazov, M. Gilfanov, N. Khavenson, A. Diachkov, I. Chulkov, B. Novikov, & A. Kuznetsov</i>	739	79-F7
A BROAD-BAND X-RAY TELESCOPE SPECTRUM OF THE MASSIVE X-RAY BINARY X PERSEI <i>Eric M. Schlegel, Peter J. Serlemitsos, Keith Jahoda, Frank Marshall, Robert Petre, Elihu Boldt, Richard Mushotzky, Jean Swank, Andrew Szymkowiak, Alan Smale, & Kim Weaver</i>	744	79-F13
LOW-FLUX HARD STATE OF IE 1740.7 - 2942 <i>E. Churazov, M. Gilfanov, R. Sunyaev, M. Pavlinsky, S. Grebenev, A. Dyachkov, V. Kovtunenko, R. Kremnev, M. Niel, P. Mandrou, G. Vedrenne, J. P. Roques, B. Cordier, A. Goldwurm, F. Lebrun, & J. Paul</i>	752	79-G9
SECOND POST-NEWTONIAN ORDER RENORMALIZATION OF FIRST POST-NEWTONIAN ORDER GRAVITY IN THE SOLAR SYSTEM <i>Ken Nordvedt</i>	758	80-A1
SOLAR CHROMOSPHERIC AND TRANSITION REGION RESPONSE TO ENERGY DEPOSITION IN THE MIDDLE AND UPPER CHROMOSPHERE <i>Alphonse C. Sterling, Kazunari Shibata, & John T. Mariska</i>	778	80-B9
CLUMPY LANGMUIR WAVES IN TYPE III RADIO SOURCES: COMPARISON OF STOCHASTIC-GROWTH THEORY WITH OBSERVATIONS <i>P. A. Robinson, I. H. Cairns, & D. A. Gurnett</i>	790	80-C9
TIME CORRELATION BETWEEN SOLAR STRUCTURAL PARAMETERS: <i>p</i> -MODE FREQUENCIES, RADIUS, AND NEUTRINO FLUX <i>Ph. Delache, V. Gavryuseva, E. Gavryuseva, F. Laclare, C. Régulo, & T. Roca Coríés</i>	801	80-D8
DUST COAGULATION <i>Arati Chokshi, A. G. G. M. Tielens, & D. Hollenbach</i>	806	80-E1
ELECTRON EXCITATION OF THE $H_2(a^3\Sigma_g^+ \rightarrow b^3\Sigma_u^+)$ CONTINUUM IN THE VACUUM ULTRAVIOLET <i>J. M. Ajello & D. E. Shemansky</i>	820	80-F1
ABSTRACTS OF THE ASTROPHYSICAL JOURNAL SUPPLEMENT SERIES, 1993 MAY		
AN ATLAS OF ULTRAVIOLET SPECTRA OF STAR-FORMING GALAXIES <i>A. L. Kinney, R. C. Bohlin, D. Calzetti, N. Panagia, & Rosemary F. G. Wyse</i>	826	80-F9
RAM PRESSURE STRIPPING FROM ELLIPTICAL GALAXIES. I. THE MASS CONTAINED IN THE GALAXY <i>D. Portnoy, S. Pustinner, & G. Shaviv</i>	826	80-F9
MULTICONFIGURATION VLA H α OBSERVATIONS OF SAGITTARIUS A West AT 1 ARCSECOND RESOLUTION <i>D. A. Roberts & W. M. Goss</i>	827	80-F10
OLD STELLAR POPULATIONS. IV. EMPIRICAL FITTING FUNCTIONS FOR FEATURES IN THE SPECTRA OF G AND K STARS <i>Javier Gorgas, S. M. Faber, David Burstein, J. Jesús Gonzalez, Stéphane Courteau, & Charles Prosser</i>	828	80-F11
COLLISIONAL EXCITATION OF H ₂ MOLECULES BY H ATOMS <i>M. E. Mandy & P. G. Martin</i>	828	80-F11
A SPECTRAL-LINE SURVEY OF W51 FROM 17.6 TO 22.0 GHz <i>M. B. Bell, L. W. Avery, & J. K. G. Watson</i>	829	80-F12
THE 1991 V603 AQUILAE CAMPAIGN: SUPERHUMPS AND <i>P</i> -DOTS <i>Joseph Patterson, Gino Thomas, David R. Skillman, & Marcos Diaz</i>	829	80-F12
OBSERVATIONS OF THE Ca II INFRARED TRIPLET IN CHROMOSPHERICALLY ACTIVE SINGLE AND BINARY STARS <i>Robert C. Dempsey, Bernard W. Bopp, Gregory W. Henry, & Douglas S. Hall</i>	830	80-F13
SOLAR MAGNETIC FIELD STUDIES USING THE 12 MICRON EMISSION LINES. II. STOKES PROFILES AND VECTOR FIELD SAMPLES IN SUNSPOTS <i>Tilak Hewagama, Drake Deming, Donald E. Jennings, Vladimir Osherovich, Gunter Wiedemann, David Zipoy, Donald L. Mickey, & Howard Garcia</i>	830	80-F13

